

WHAT IS CLAIMED:

1. A radio comprising:
  - a first channel for receiving signals at a first carrier frequency;
  - a second channel for receiving and transmitting signals at a second carrier frequency;
  - a multiplexer connected to the first and second channels;
  - an A/D converter and a D/A converter connecting the channels through the multiplexer to a digital signal processor;
  - an oscillator connected to and providing a common sampling rate to the A/D and D/A converters; and
  - the digital signal processor controlling the multiplexer and modifying received and transmitted digital signals to accommodate for the different carrier frequencies using the common sampling rate.
2. The radio according to Claim 1, including a frequency synthesizer connected to the oscillator and providing different frequency signals to the first and second channels.
3. The radio according to Claim 1, including a third channel for receiving and transmitting signals at a third carrier frequency and connected to the multiplexer.
4. The radio according to Claim 3, including a frequency synthesizer connected to the oscillator and providing different frequency signals to the first, second and third channels.
5. The radio according to Claim 3, wherein the processor performs communication protocols for at least two of the channels simultaneously.
6. The radio according to Claim 1, wherein the processor performs communication protocols for the first and second channels simultaneously.

7. The radio according to Claim 1, wherein the first channel is designed to receive GPS signals, and the second channel is designed to receive signals from the group of WLAN, Blue Tooth, GSM, GPRS and WCDMA.

8. The radio according to Claim 1, wherein the radio is a software-defined radio.

9. The radio according to Claim 1, wherein the processor accommodates for the different frequency signals by linear interpolation of the sampling rate.

10. The radio according to Claim 9, wherein the linear interpolation for each interpolated sample  $Y_n$ , at the desired sampling rate  $T_0$ , is calculated from two samples  $X_{n+1}$ ,  $X_n$  at the common sampling rate  $T_s$  as:

$$Y_n = X_n + n (T_0 - T_s) / T_s (X_{n+1} - X_n).$$